CHAPTER 17
Productivity and Quality in Operations

Operations Management

The design, planning, and control of the factors that enable us to provide the product or service outputs of the organization.

Operating Systems

<table>
<thead>
<tr>
<th>Low variety/High volume (Specific purpose)</th>
<th>High variety/Low volume (Flexible purpose)</th>
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</thead>
<tbody>
<tr>
<td>Product orientation</td>
<td>Process orientation</td>
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VOLUME/VARIETY CONTINUUM
Manufacturing Systems

- Repetitive Systems
- Continuous-Flow System
- Job-Shop System
- Project System

Service Systems

- Standard Service Systems
- Custom Service Systems

Operations Management Decisions

- Long-term
- Short-term
### Long-Term System Design Decisions

- Choice of a product or service
- Product or service design
- System capacity
- Process selection
- Facility location

### Facility Layout

The arrangement of the work areas and equipment so that inputs progress through the transformation process in as orderly a fashion as possible.

### Facility Layout Issues

- Process layout
- Product layout
- Hybrid layout
- Fixed position layout
Short-Term Decisions

- Aggregate planning
- Master production schedule
- Inventory management
- Materials requirement planning
- Just-in-time inventory management
- Supply chain management

Aggregate Planning

- Customer demand
- Resources
- Costs

Master Production Schedule

- A detailed statement
  - Each item
  - Each time period
- A more detailed breakdown
Inventory Management

- Raw materials
- Work-in process
- Finished goods
- Supplies

Materials Requirements Planning

Methodology that uses the production schedule for the finished products to derive demand and production schedules for component items that make up the final product.

Just-in-Time Inventory Management

- Continual improvement in operations
- Reduce inventory
Supply Chain Management (SCM)

- Suppliers
- Warehouses
- Operations
- Retail outlets

... to synchronize functions

Productivity

A measure of the efficiency with which a firm transforms inputs into outputs, calculated as output divided by input.

\[
\text{Productivity} = \frac{\text{system outputs}}{\text{system inputs}}
\]

Improving Productivity

- Technology
- Diverse workforce
- Design
### Fundamentals of Quality

- Quality Control (QC)
- Quality Assurance (QA)
- Total Quality Management (TQM)

### Assessing Quality

- Product Factors
- Service Factors

### Cost of Quality

- Prevention Costs
- Appraisal Costs
- Internal-Failure Costs
- External-Failure Costs
### TQM - Global Competitiveness

- Customer-driven standards
- Management and labor commitment
- Organization and coordination of effects
- Employee participation

### Customer-Driven Standards

- External customer
- Internal customer

### Management and Labor

- Organizational culture
  - Embraced by top leaders
  - Communicated by leaders
### Organization and Coordination

- Benchmarking
- Kaizen

### Employee Participation

- Quality Circle
- Special-Purpose Team

### Quality Management Philosophers

- W. Edwards Deming
- Joseph Juran
- Armand Feigenbaum
- Kaoru Ishikawa
- Philip Crosby